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Mi

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(54) **SYSTEM AND METHOD FOR INTEGRATING INFRARED REMOTE CONTROLS OF HOME APPLIANCES**

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H04B 10/00 (2013.01)
G08C 23/04 (2006.01)
G08C 17/02 (2006.01)

(52) **U.S. Cl.**
CPC ***G08C 23/04*** (2013.01); ***G08C 17/02*** (2013.01); *G08C 2201/30* (2013.01); *G08C 2201/70* (2013.01)

(58) **Field of Classification Search**
CPC G08C 23/04; G08C 17/02; G08C 2201/30; G08C 2201/70
USPC 398/106
See application file for complete search history.

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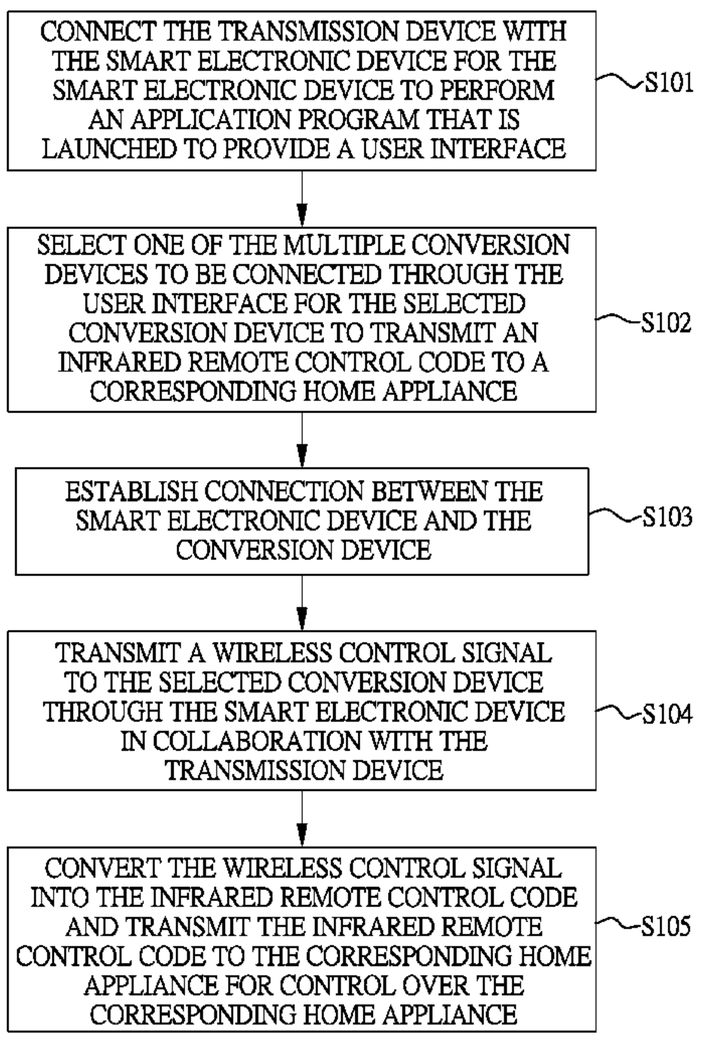
(57) **ABSTRACT**

A system for integrating infrared remote controls of home appliances includes a smart electronic device, a transmission device and multiple conversion devices. The smart electronic device is collaborated with the transmission device to transmit a wireless control signal. The multiple conversion devices are respectively mounted on multiple home appliances. After receiving the wireless control signal, a selected conversion device converts the wireless control signal into an infrared remote control code that is further transmitted to a corresponding home appliance for remote control. Because of transmission using radio signals between the transmission device and the multiple conversion devices, there is no concern for communication failure arising from obstruction, limited distance and high directivity demanding to be within a receiving angle upon remote control. As only one remote control is used, operational convenience increases. Additionally, some home appliances can be jointly controlled according to a configured situation.

26 Claims, 14 Drawing Sheets



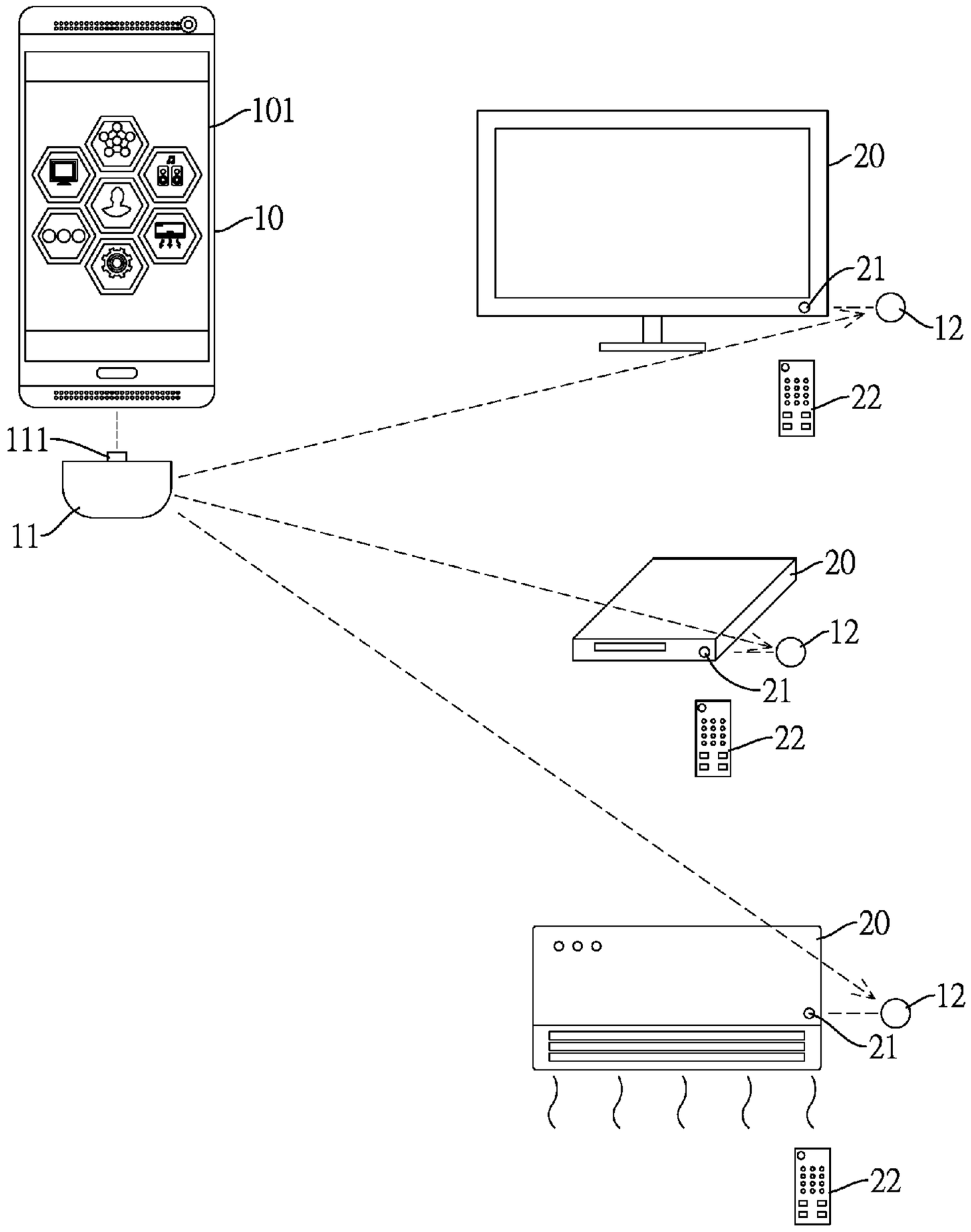


FIG.1

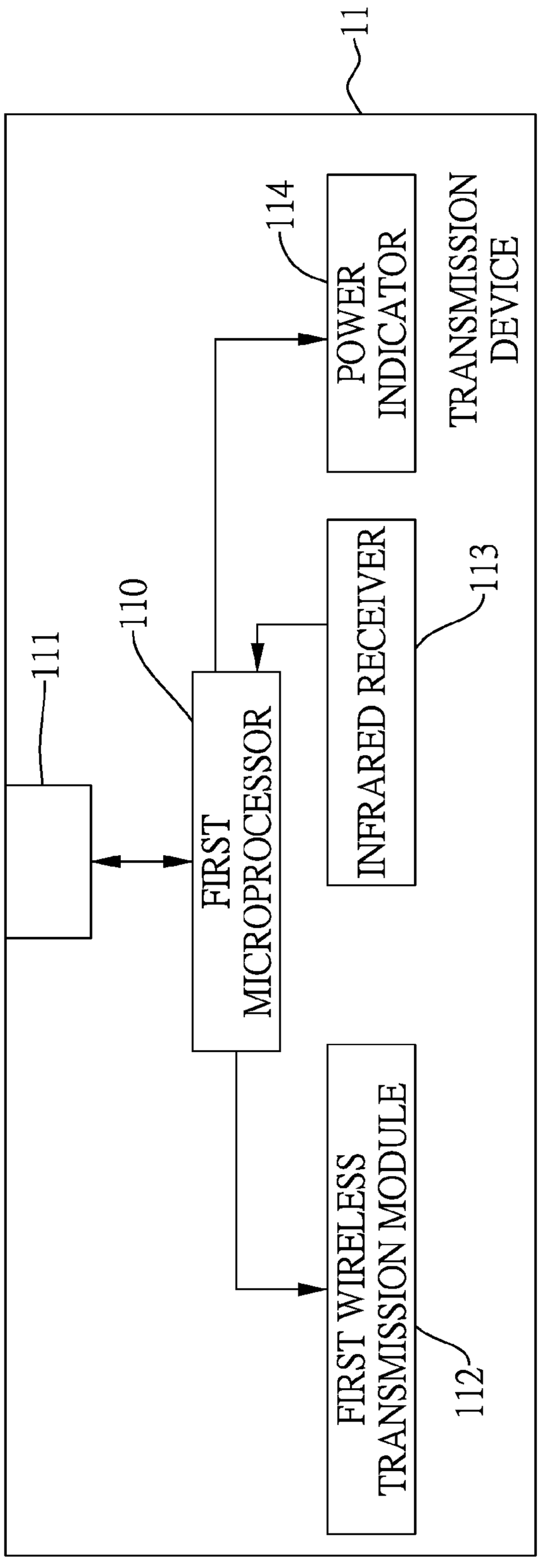

11
114
POWER INDICATOR
TRANSMISSION DEVICE
111
110
FIRST MICROPROCESSOR
INFRARED RECEIVER
113
FIRST WIRELESS TRANSMISSION MODULE
112

FIG.2

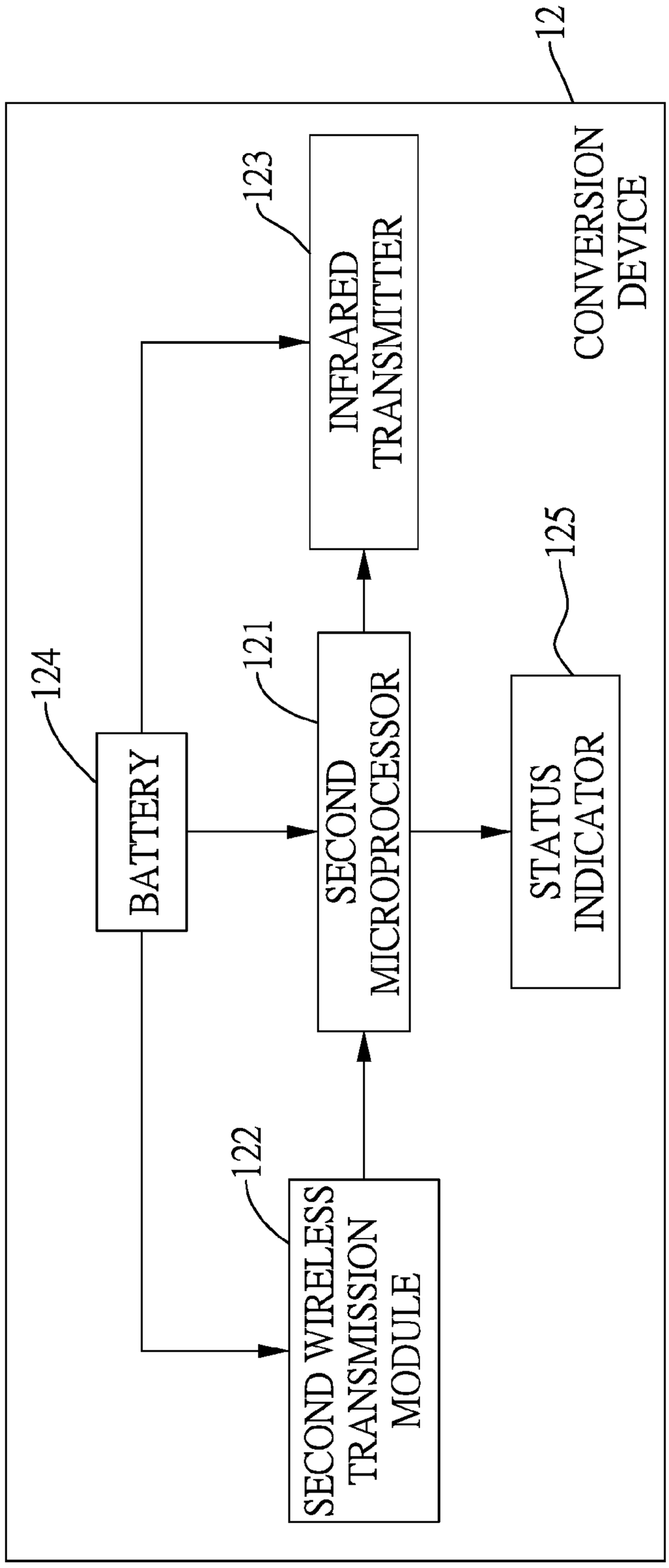

12
CONVERSION DEVICE
123
INFRARED TRANSMITTER
124
BATTERY
121
SECOND MICROPROCESSOR
125
STATUS INDICATOR
122
SECOND WIRELESS TRANSMISSION MODULE

FIG.3

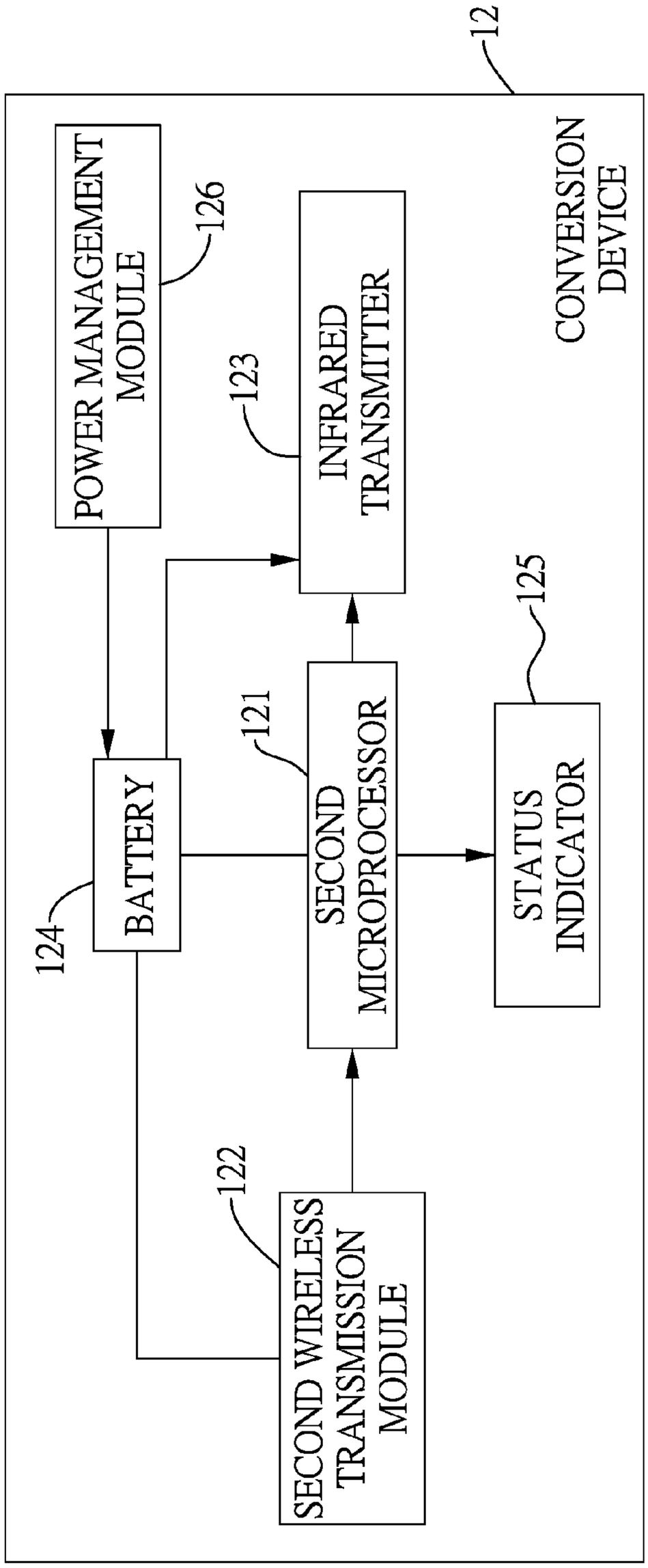

12
CONVERSION DEVICE
POWER MANAGEMENT MODULE
126
123
INFRARED TRANSMITTER
121
SECOND MICROPROCESSOR
125
STATUS INDICATOR
124
BATTERY
122
SECOND WIRELESS TRANSMISSION MODULE

FIG.4

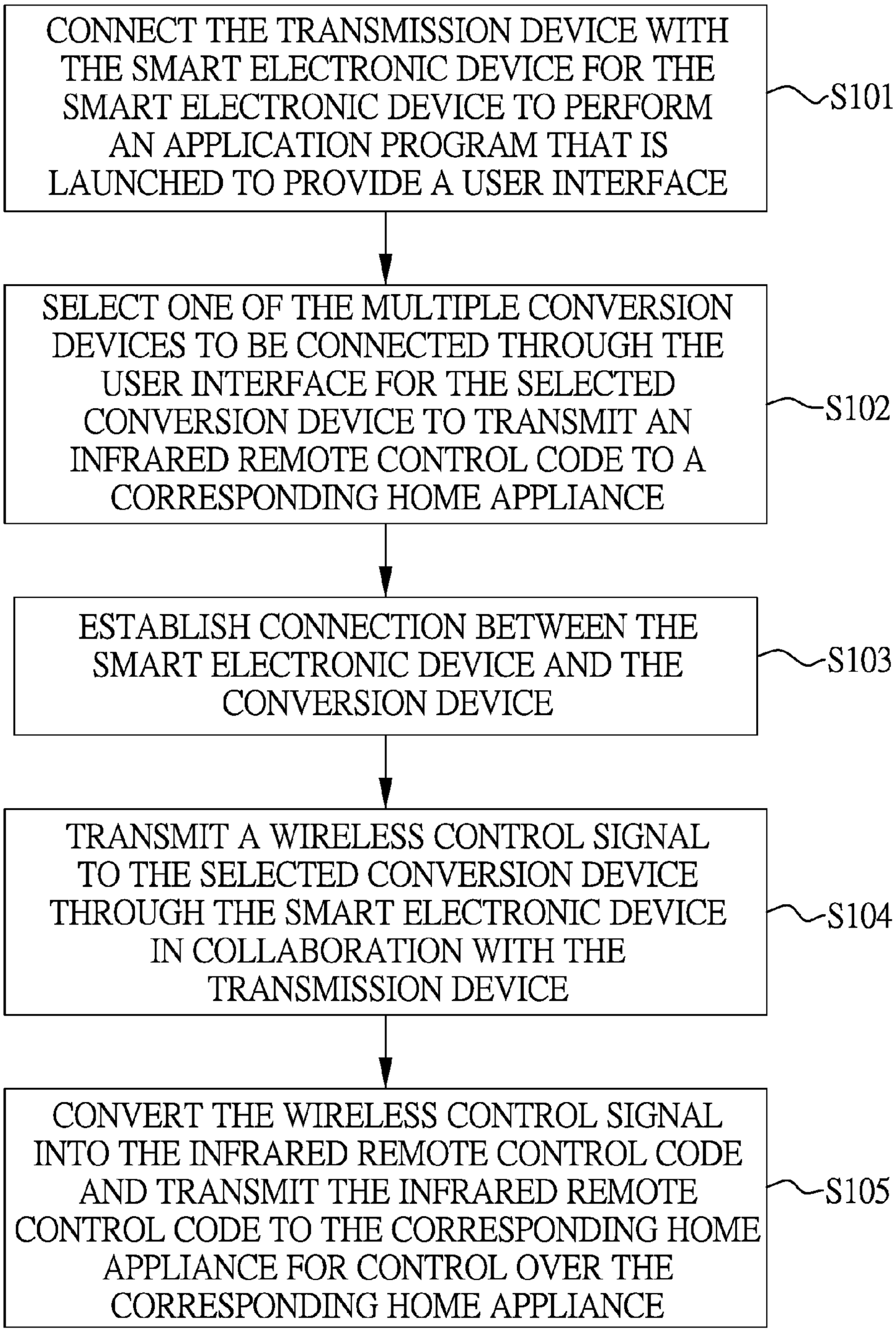

CONNECT THE TRANSMISSION DEVICE WITH THE SMART ELECTRONIC DEVICE FOR THE SMART ELECTRONIC DEVICE TO PERFORM AN APPLICATION PROGRAM THAT IS LAUNCHED TO PROVIDE A USER INTERFACE
S101
SELECT ONE OF THE MULTIPLE CONVERSION DEVICES TO BE CONNECTED THROUGH THE USER INTERFACE FOR THE SELECTED CONVERSION DEVICE TO TRANSMIT AN INFRARED REMOTE CONTROL CODE TO A CORRESPONDING HOME APPLIANCE
S102
ESTABLISH CONNECTION BETWEEN THE SMART ELECTRONIC DEVICE AND THE CONVERSION DEVICE
S103
TRANSMIT A WIRELESS CONTROL SIGNAL TO THE SELECTED CONVERSION DEVICE THROUGH THE SMART ELECTRONIC DEVICE IN COLLABORATION WITH THE TRANSMISSION DEVICE
S104
CONVERT THE WIRELESS CONTROL SIGNAL INTO THE INFRARED REMOTE CONTROL CODE AND TRANSMIT THE INFRARED REMOTE CONTROL CODE TO THE CORRESPONDING HOME APPLIANCE FOR CONTROL OVER THE CORRESPONDING HOME APPLIANCE
S105

FIG.5

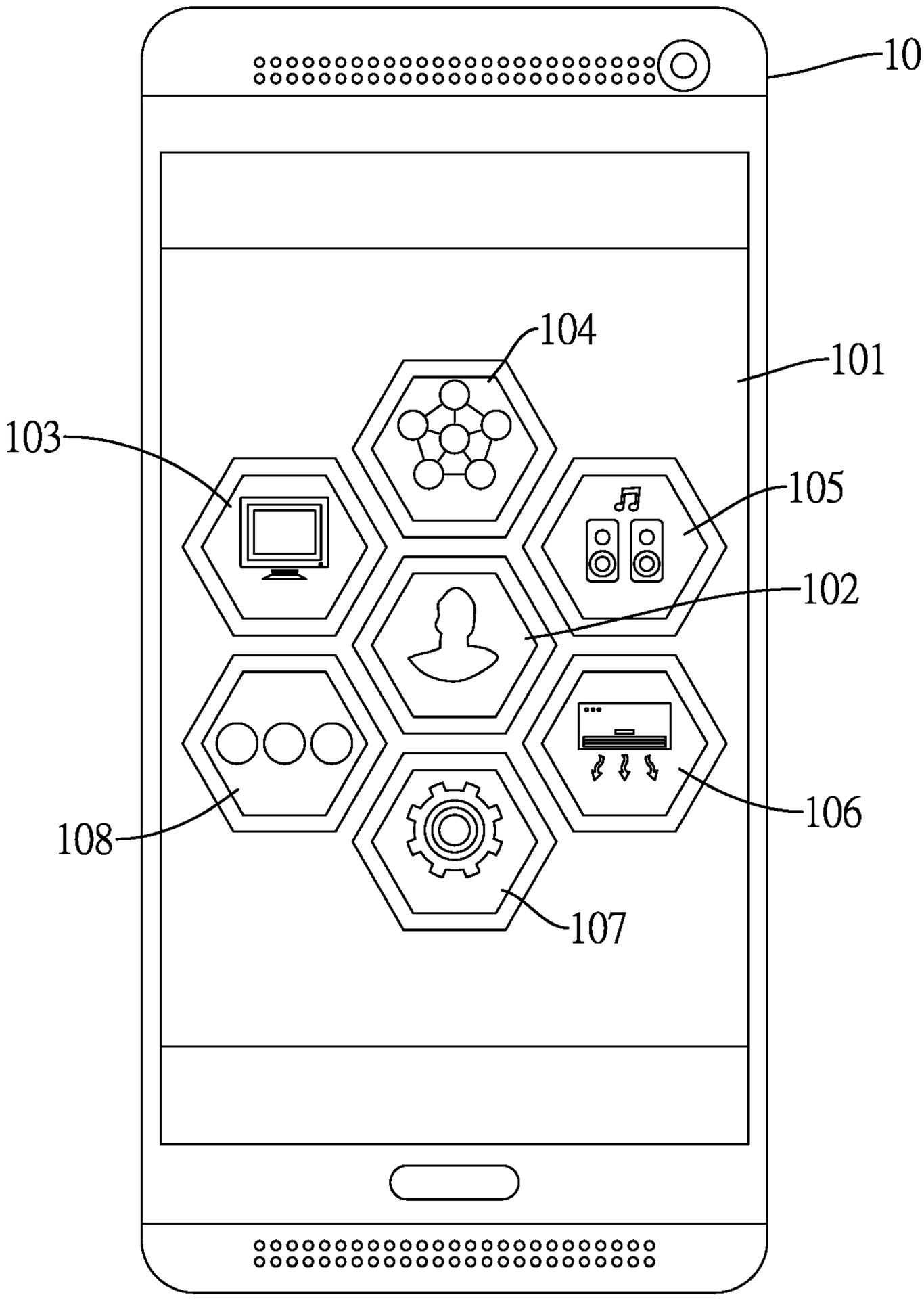


FIG.6A

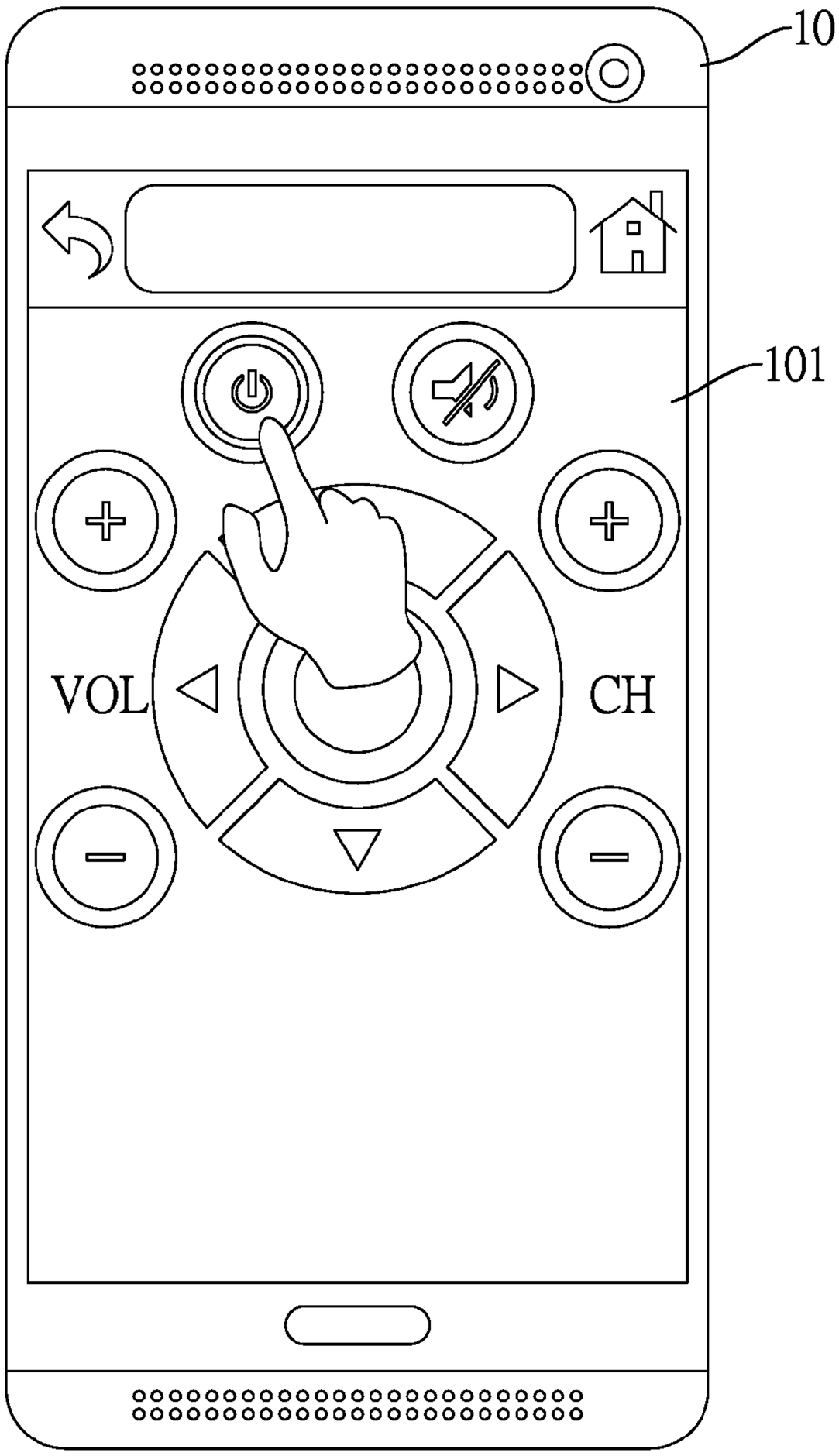


FIG.6B

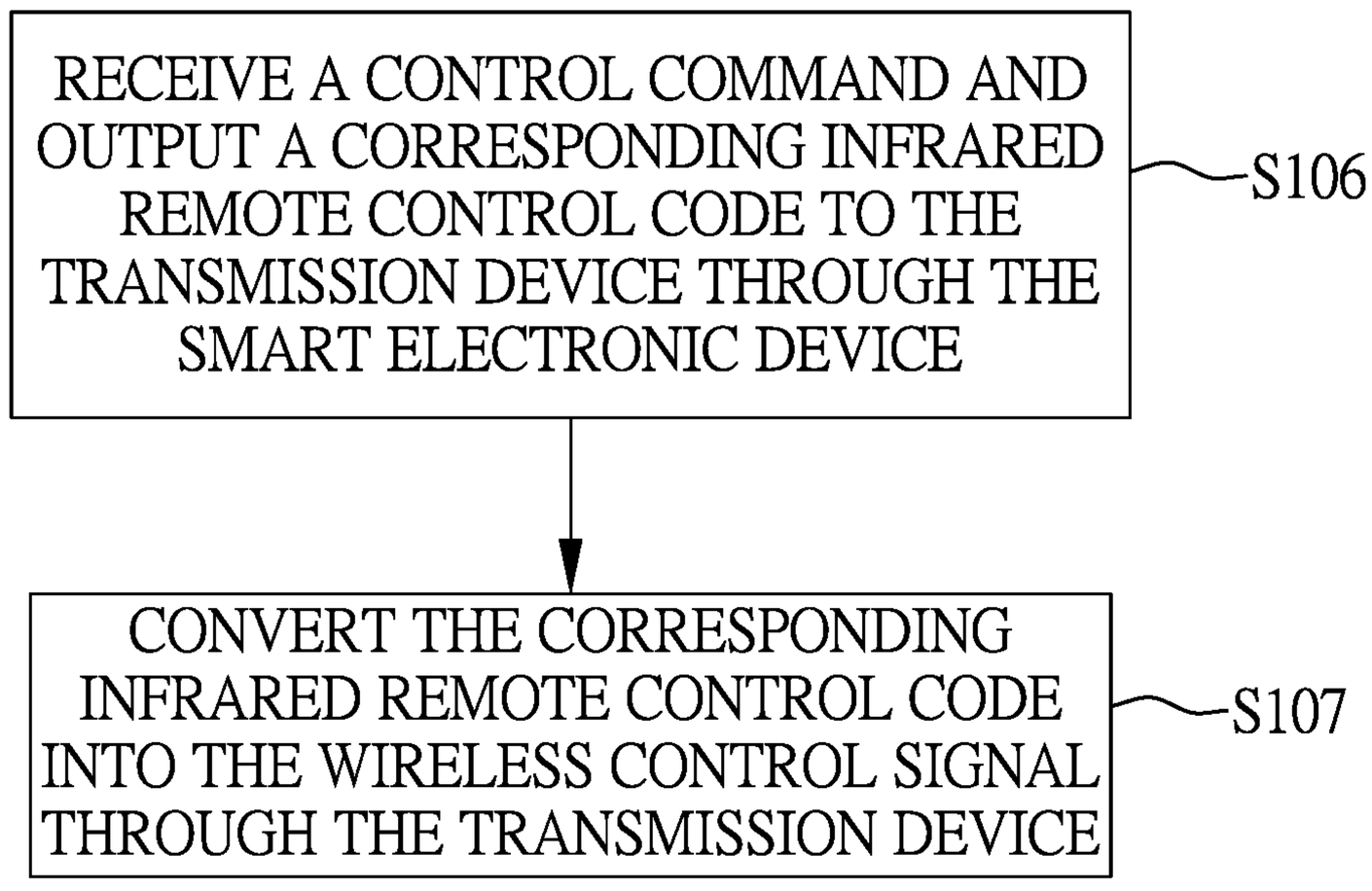

RECEIVE A CONTROL COMMAND AND OUTPUT A CORRESPONDING INFRARED REMOTE CONTROL CODE TO THE TRANSMISSION DEVICE THROUGH THE SMART ELECTRONIC DEVICE
S106
CONVERT THE CORRESPONDING INFRARED REMOTE CONTROL CODE INTO THE WIRELESS CONTROL SIGNAL THROUGH THE TRANSMISSION DEVICE
S107

FIG.7A

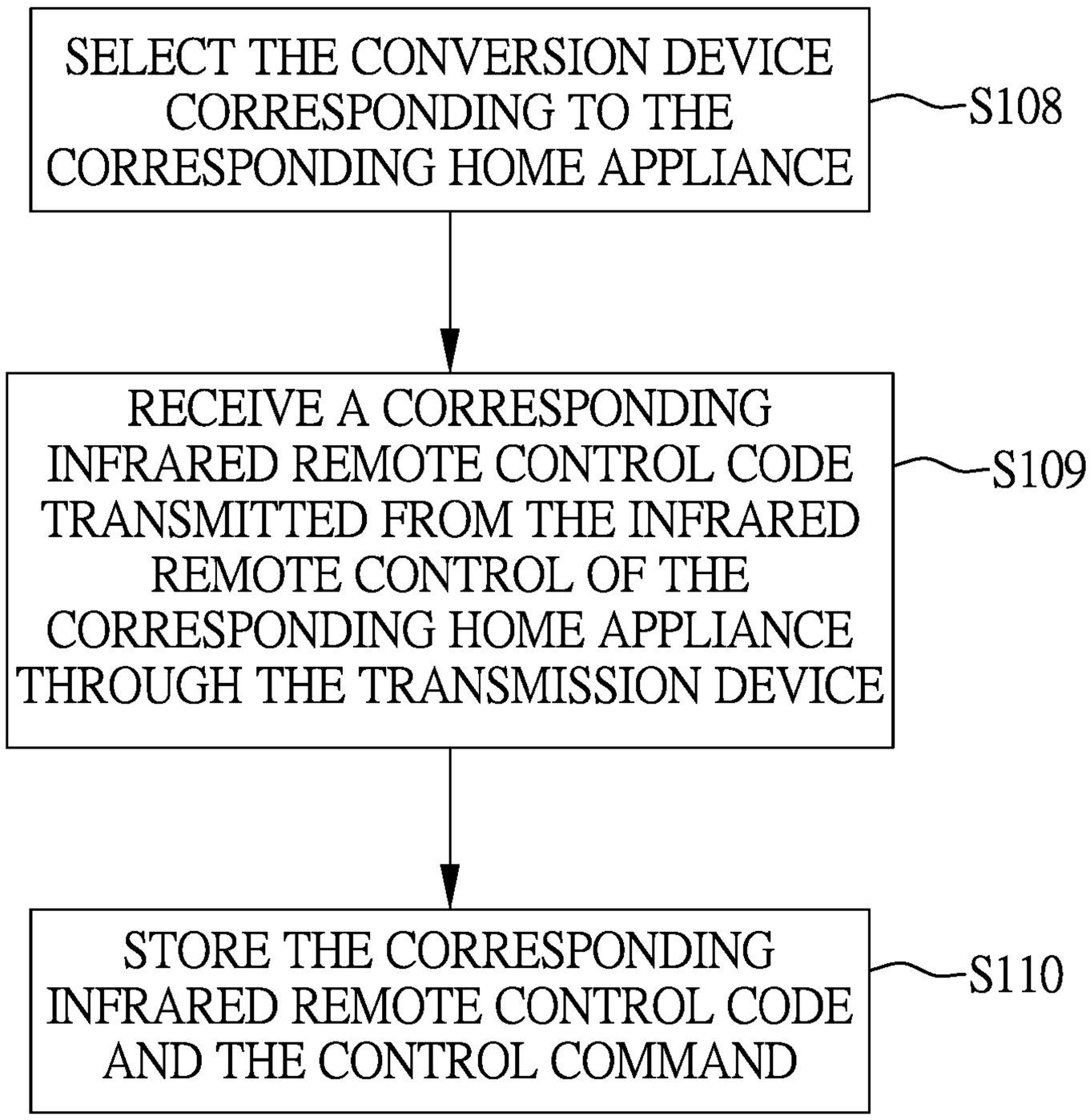

SELECT THE CONVERSION DEVICE CORRESPONDING TO THE CORRESPONDING HOME APPLIANCE
S108
RECEIVE A CORRESPONDING INFRARED REMOTE CONTROL CODE TRANSMITTED FROM THE INFRARED REMOTE CONTROL OF THE CORRESPONDING HOME APPLIANCE THROUGH THE TRANSMISSION DEVICE
S109
STORE THE CORRESPONDING INFRARED REMOTE CONTROL CODE AND THE CONTROL COMMAND
S110

FIG.7B

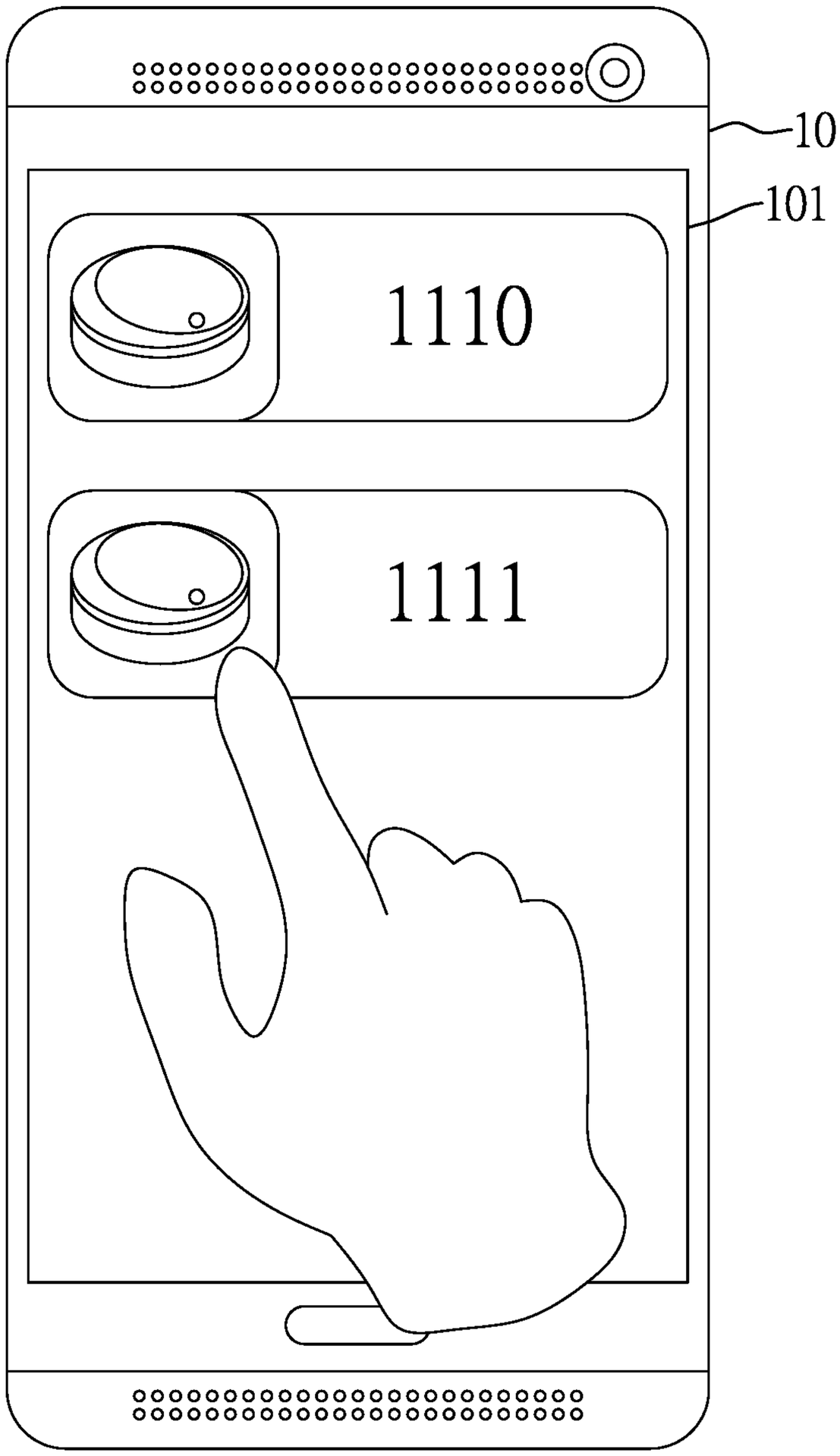


FIG.8A

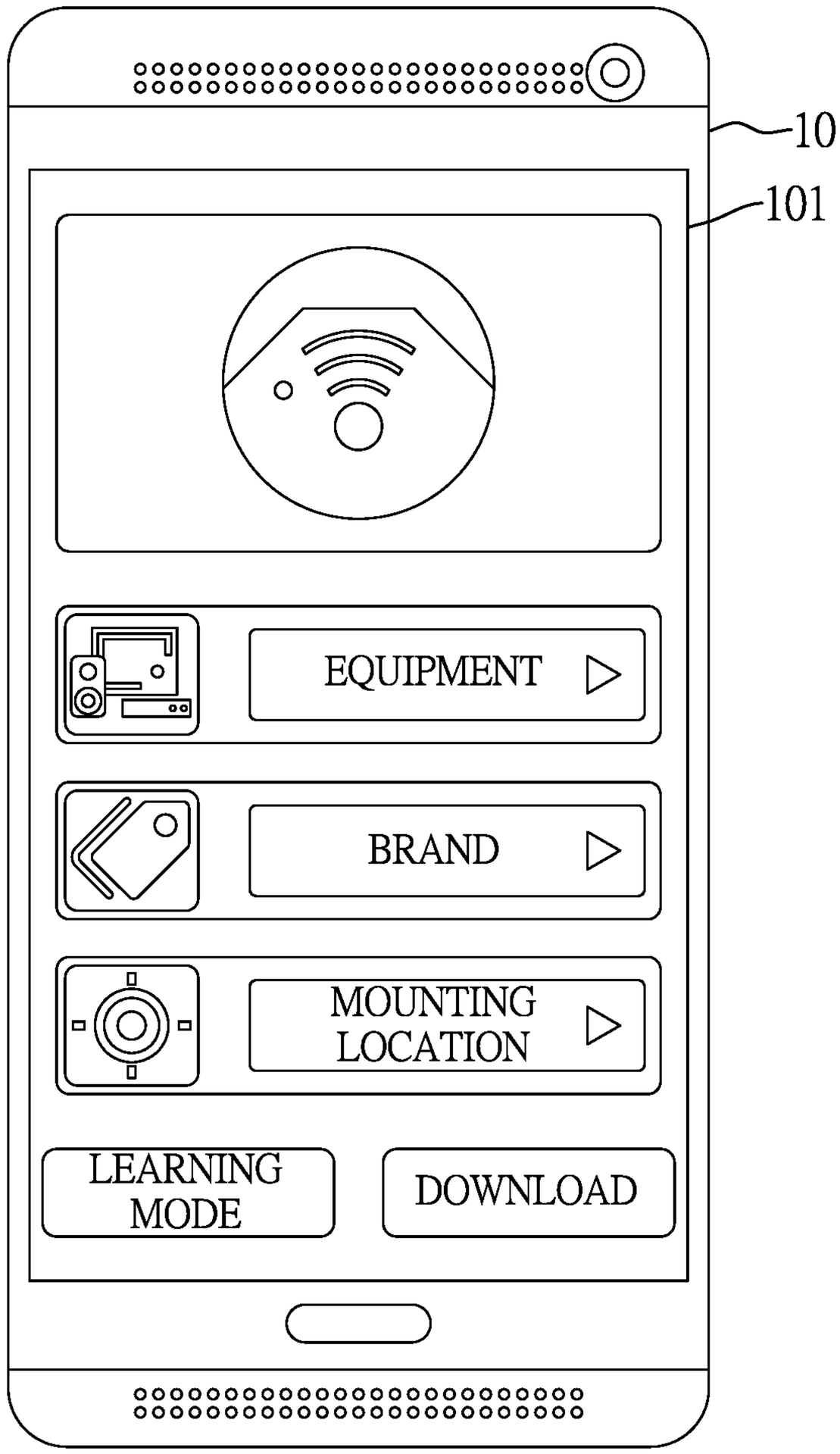

10
101
EQUIPMENT
BRAND
MOUNTING LOCATION
LEARNING MODE
DOWNLOAD

FIG.8B

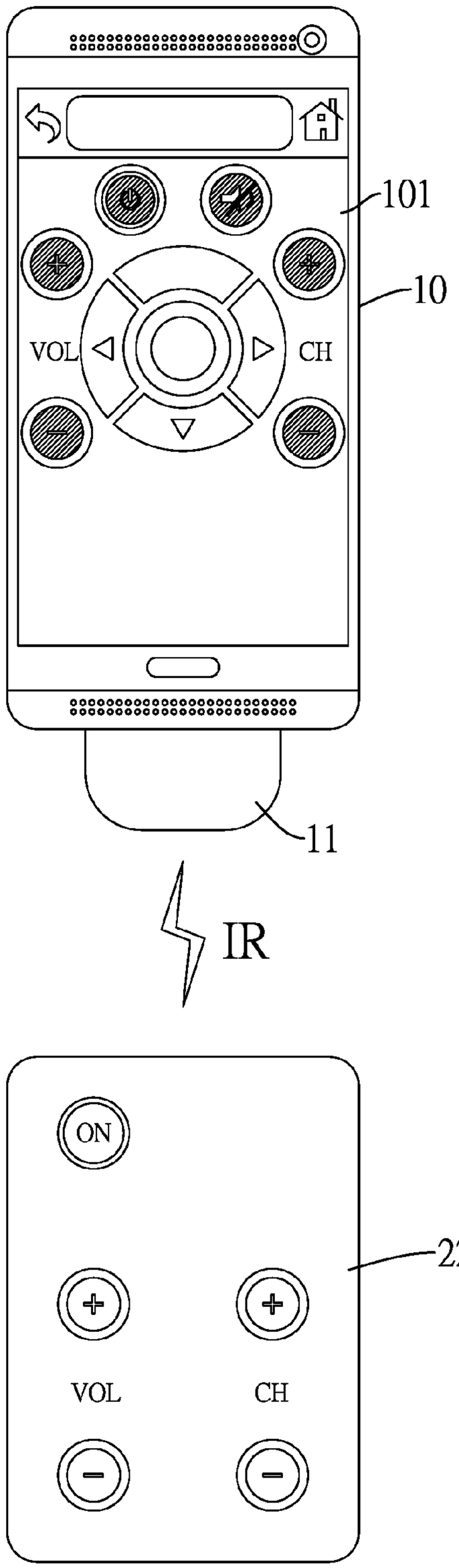


FIG.8C

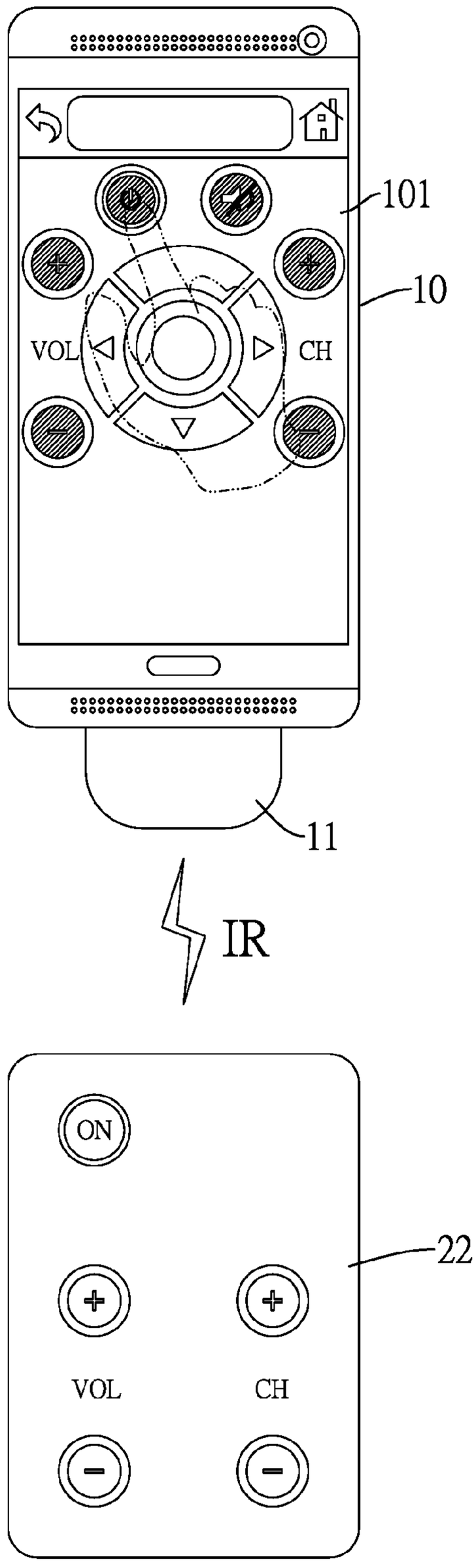
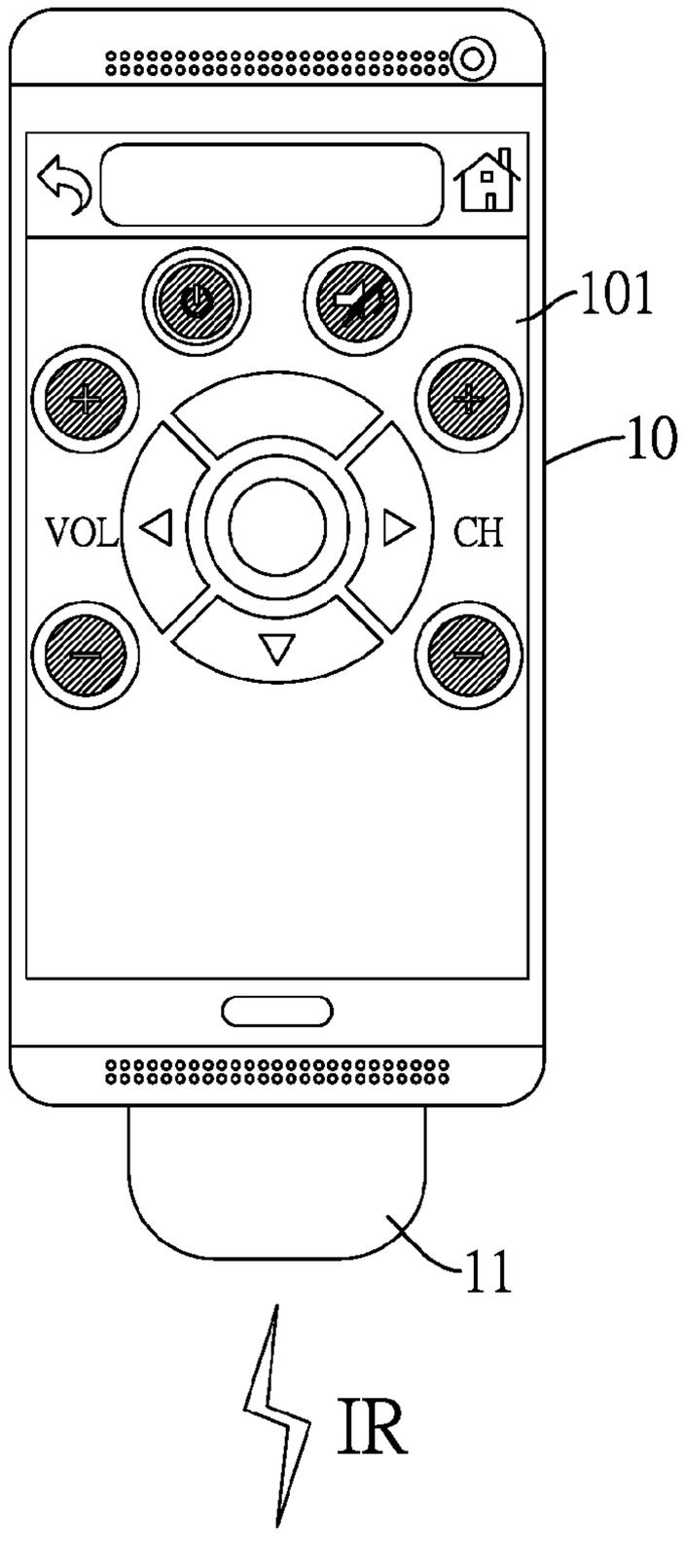


FIG.8D



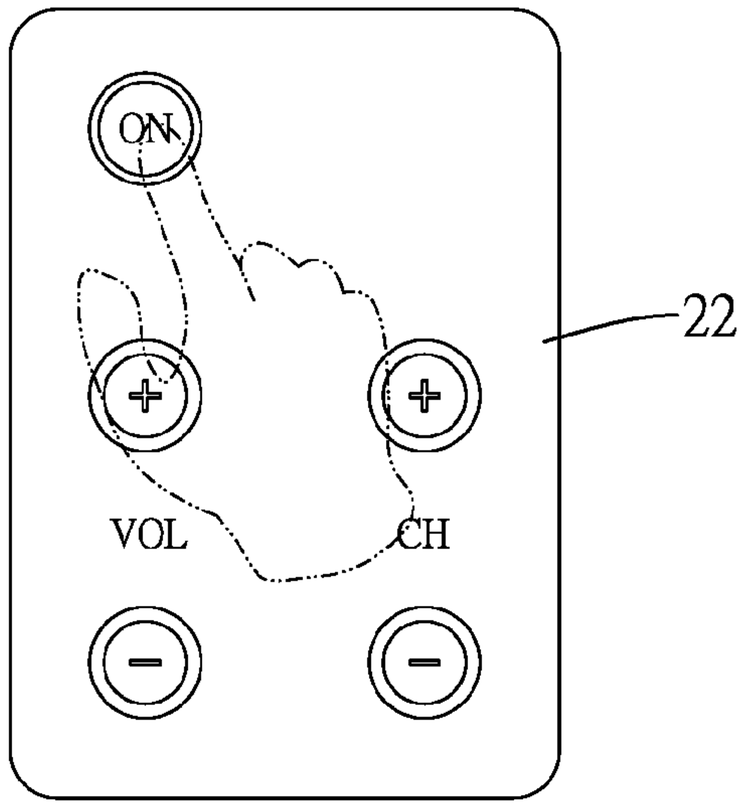


FIG.8E

SYSTEM AND METHOD FOR INTEGRATING INFRARED REMOTE CONTROLS OF HOME APPLIANCES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a system and a method for integrating infrared remote controls of home appliances and, more particularly, to a system and a method using a smart electronic device to remotely control multiple home appliances with infrared control.

2. Description of the Related Art

Currently, home appliances usually have a corresponding remote control, such as remote controls for a TV (Television), a set-top box, a DVD (Digital Video Disc) player, a stereo system and the like. To easily control any home appliance, a corresponding remote control for the home appliance must be located first. More and more different types of home appliances are added to the household environment of everyone because of continuous technological advancement. It ends up with a plentiful of remote controls at home and consumes more time in search of a remote control to be located before a corresponding home appliance can be controlled.

Besides, most current remote controls adopt infrared radiation for transmission of control signals. However, obstruction occurring between a remote control and a corresponding home appliance causes failure of transmission for control signals between the remote control and the corresponding home appliance. Meanwhile, as each infrared receiver has its unique acceptance angle and distance range, infrared control signals beyond the acceptance angle or the distance range fail to be received by a corresponding home appliance. Under the circumstance, the corresponding home appliance fails to be remotely controlled by the remote control.

SUMMARY OF THE INVENTION

An objective of the present invention is to provide a system and a method for integrating infrared remote controls of home appliances to ensure increased convenience and less communication failure for remote control.

To achieve the foregoing objective, the system for integrating infrared remote controls of home appliances includes a smart electronic device, a transmission device and multiple conversion devices.

The smart electronic device has an operating system to perform an application program. The application program displays a user interface and stores multiple infrared remote control codes for respectively controlling multiple home appliances. Each infrared remote control code corresponds to a control command inputted from the user interface and the smart electronic device outputs a corresponding infrared remote control code.

The transmission device is connected to the smart electronic device and has an infrared receiver, a first microprocessor and a first wireless transmission module.

The infrared receiver is connected to the first microprocessor and receives the corresponding infrared remote control code.

The first microprocessor serves to convert the corresponding infrared remote control code into a wireless control signal.

The first wireless transmission module is connected to the first microprocessor and transmits the wireless control signal.

The multiple conversion devices are mounted on the respective home appliances. Each conversion device has a second wireless transmission module, a second microprocessor and an infrared transmitter.

The second wireless transmission module is wirelessly connected to the first wireless transmission module and receives the wireless control signal.

The second microprocessor is connected to the second wireless transmission module and converts the wireless control signal into the corresponding infrared remote control code.

The infrared transmitter is connected to the second microprocessor and transmits the corresponding infrared remote control code to a corresponding home appliance.

Based on the foregoing system, the smart electronic device performs the application program to display the user interface with one of the multiple conversion device displayed thereon selected. The first wireless transmission and the second wireless transmission module are wirelessly connected. The control command is inputted through the user interface. The smart electronic device transmits a corresponding infrared remote control code to the transmission device according to the control command. The first microprocessor further converts the corresponding infrared remote control code into a wireless control signal. The first wireless transmission module transmits the wireless control signal to the second wireless transmission module. After the second wireless transmission module receives the wireless control signal, the second microprocessor converts the wireless control signal into the corresponding infrared remote control code. The infrared transmitter transmits the corresponding infrared control code to the infrared receiver of a corresponding home appliance for remote control over the corresponding home appliance.

To achieve the foregoing objective, the method for integrating infrared remote controls of home appliances is performed by a system for integrating infrared remote controls of home appliances having a smart electronic device, a transmission device and multiple conversion devices. The method includes steps of:

connecting the transmission device with the smart electronic device for the smart electronic device to perform an application program, wherein the application program is launched to provide a user interface;

selecting one of the multiple conversion devices to be connected through the user interface, wherein the selected conversion device transmits an infrared remote control code to a corresponding home appliance;

establishing connection between the smart electronic device and the conversion device;

transmitting a wireless control signal to the selected conversion device through the smart electronic device in collaboration with the transmission device; and

converting the wireless control signal into the infrared remote control code and transmitting the infrared remote control code to the corresponding home appliance for control over the corresponding home appliance.

From the foregoing description, the method utilizes the smart electronic device to perform the application, selects one of the multiple conversion devices to be connected through the user interface to establish connection, inputs the control command and a corresponding infrared remote control code through the user interface to generate the wireless control signal in the form of a radio signal, transmits the

wireless control signal to the selected conversion device for the selected conversion device to convert the wireless control signal into the corresponding infrared remote control code, and transmits the corresponding infrared remote control code to a corresponding home appliance to complete the remote control. Given the transmission using radio signals between the transmission device and the multiple conversion devices, there is no concern for communication failure arising from obstruction, limited distance and high directivity demanding to be within a receiving angle upon remote control. As the smart electronic device is collaborated with the transmission device to act as an integrated remote control for the multiple home appliances, operational convenience increases with simplified equipment requirement, such that users do not have to fumble around in search of all the infrared remote controls.

Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic view of a system for integrating infrared remote controls of home appliances in accordance with the present invention;

FIG. **2** is a functional block diagram of a transmission device of the system in FIG. **1**;

FIG. **3** is a functional block diagram of an embodiment of a conversion device of the system in FIG. **1**;

FIG. **4** is a functional block diagram of another embodiment of a conversion device of the system in FIG. **1**;

FIG. **5** is a flow diagram of a method for integrating infrared remote controls of home appliances in accordance with the present invention;

FIGS. **6**A and **6**B are schematic views showing a user interface of a smart electronic device of the system in FIG. **1**;

FIG. **7**A is a flow diagram of additional steps of the method in FIG. **5**;

FIG. **7**B is a flow diagram of a learning mode of the method in FIG. **5**; and

FIGS. **8**A to **8**E are schematic views showing the user interface of the smart electronic device in FIGS. **6**A and **6**B upon the learning mode.

DETAILED DESCRIPTION OF THE INVENTION

With reference to FIG. **1**, a system for integrating infrared remote controls of home appliances in accordance with the present invention is used to integrate the remote controls of various home appliances and controls those home appliances based on transmission of radio waves. The system for integrating infrared remote controls of home appliances includes a smart electronic device **10**, a transmission device **11** and multiple conversion devices **12**. The multiple conversion devices **12** are respectively mounted on multiple home appliances **20**. Each home appliance **20** has an infrared appliance receiver **21** and an infrared remote control **22**. The smart electronic device **10** may be a regular smart phone or a tablet PC (Personal Computer) and is installed an OS (operating system) and an application program. After the application program in the smart electronic device **10** is launched, the OS displays a user interface **101** on a screen of the smart electronic device **20**. The OS may be one of Android °, iOS®, Windows® operating system. The smart electronic device **10** is connected with the transmission device **11**.

With reference to FIG. **2**, the transmission device **11** has a first microprocessor **110**, a connection plug **111**, a first wireless transmission module **112**, an infrared receiver **113** and a power indicator **114**. The first microprocessor **110** is connected to the connection plug **111**, an output terminal of the microprocessor **110** is connected to an input terminal of the first wireless transmission module **112**, and an output terminal of the infrared receiver **113** is connected to an input terminal of the first microprocessor **110**, such that the smart electronic device **10** can transmit signals through the transmission device **11**. The connection plug **111** may be a Micro USB (Universal Serial Bus) plug or another other connector and is plugged in a connection port of the smart electronic device **10**, such as a USB port. When the transmission device **111** is connected with the smart electronic device **10**, the power indicator **114** is lit. The smart electronic device **10** needs to support the USB OTG (On-the-go) for the transmission device **11** to change from a peripheral device to a USB host equipment. Thus, the transmission device **11** can perform self-initiated data transmission. Moreover, the USB host equipment can be selected from a setting of the smart electronic device **10** for the transmission device **11** to become a plug-and-play device for ease of use.

The multiple conversion devices **12** can be attached to, stuck on or magnetically attracted to the multiple home appliances **20** respectively. With reference to FIG. **3**, an embodiment of the multiple conversion devices **12** is shown. Each conversion device **12** has a second microprocessor **121**, a second wireless transmission module **122**, an infrared transmitter **123**, a battery **124** and a status indicator **125**. An output terminal of the second wireless transmission module **122** is connected to an input terminal of the second microprocessor **121**. An output terminal of the second microprocessor **121** is connected to an input terminal of the infrared transmitter **123**. An input terminal of the status indicator **125** is connected to an output terminal of the second microprocessor **121**. The battery **124** is connected to the second wireless transmission module **122**, the infrared transmitter **123** and the second microprocessor **121** to supply operating power thereto. Each conversion device **12** utilizes the second wireless transmission module **122** to wirelessly connect to the smart electronic device **10**. The second wireless transmission module **122** and the first wireless transmission module **112** pair up with each other and communicate with each other according to a same communication protocol, such as ZigBee, Bluetooth or WiFi (Wireless Fidelity). The infrared transmitter **123** of each conversion device **12** transmits signals to the infrared appliance receiver **21** of a corresponding home appliance **20** in an obstruction-free manner. The status indicator **125** is lit up to indicate a status of the conversion device, such as "connected", "connection successful" or "disconnected", by means of color and blinking effect of light emitted from the status indicator **125**.

With reference to FIG. **4**, another embodiment of the multiple conversion devices **12** is shown. Each conversion device **12** has a power management module **126** that is electrically connected to the battery **124** and the second microprocessor **121** for management of power stored in the battery **124**. In the present embodiment, when the second wireless transmission module **122** of each conversion device **12** receives no signal from the first wireless transmission module **112** in the transmission device **11** within a preset time, the power management module **126** perform power control to reduce the power supplied by the battery **124**.

Thus, the conversion device **12** stays at a low-power standby mode for less power consumption.

With reference to FIG. **5**, a method for integrating infrared remote controls of home appliances in accordance with the present invention includes the following steps.

Step S**101**: Connect the transmission device **11** with the smart electronic device **10**. The smart electronic device **10** performs the application program. The application program is launched to provide the user interface **101**.

Step S**102**: Select one of the multiple conversion devices **12** to be connected through the user interface **101**. The selected conversion device **12** transmits an infrared remote control code to a corresponding home appliance **20**.

Step S**103**: Establish connection between the smart electronic device **10** and the conversion device **12**.

Step S**104**: Transmit a wireless control signal to the selected conversion device **12** through the smart electronic device in collaboration with the transmission device **11**. The wireless control signal is a radio signal.

Step S**105**: Convert the wireless control signal into the infrared remote control code and transmit the infrared remote control code to the corresponding home appliance **20** for control over the corresponding home appliance **20**.

In step S**101** the application program can be downloaded to the smart electronic device **10** from a specific website (or from scanning of QR code for connection to the specific website) or from an on-line APP (Application) store built in the OS for execution of the application program. After the application program is launched, the smart electronic device **10** is connected with the transmission device **11**. Supposing that the transmission device **11** fails to be connected to the smart electronic device **10**, the user interface **101** provided by the application program displays a status that the transmission device **11** is not connected. Under the circumstance, there is no way that functions of the remote control can be operated through execution of the application program. The connection plug **111** of the transmission device **11** is plugged in the connection port of the smart electronic device **10**. It is the connection plug **111** and the connection port that are respectively employed by the transmission device **11** and the smart electronic device **10**. After the transmission device **11** is connected with the smart electronic device **10**, the user interface **101** displays a status that the transmission device **11** is connected, such that the smart electronic device **10** can be collaborated with the transmission device **11** to launch the application program so as to provide an integrated remote control for the multiple home appliances and thus replace the multiple infrared remote controls **22** of the multiple home appliances **20**.

With reference to FIG. **6**A, after the smart electronic device **10** launches the application program, the user interface **101** is displayed on a screen of the smart electronic device. The user interface **101** has multiple options including but not limited to a user option **102**, an image option **103**, a situational option **104**, a music option **105**, an air-conditioning option **106**, a configuration option **107**, and another option **108** for users' selection. In step S**102** one of the multiple options is chosen for selection of one of the multiple conversion devices to be connected. The selected conversion device **12** is mounted on a corresponding home appliance **20** in a way that the infrared transmitter of the selected conversion device **12** is directed to the infrared appliance receiver **21** of the corresponding home appliance **20** for transmission of the infrared remote control code.

In step S**103** after selection of one of the multiple conversion device **12**, with reference to FIG. **6**B, the user interface **101** further displays multiple buttons thereon similar to those buttons of the infrared remote control **22** for the corresponding home appliance **20** to establish connection between the smart electronic device **10** and the selected conversion device **12**.

With reference to FIG. **7**A, step S**104** further includes the following steps.

Step S**106**: Receive a control command and output a corresponding infrared remote control code to the transmission device **11** through the smart electronic device.

Step S**107**: Convert the corresponding infrared remote control code into the wireless control signal through the transmission device **11**.

With further reference to FIG. **6**B, one of the multiple buttons on the user interface **101** is selected to input the control command. In step S**106** the smart electronic device receives the control command and output the corresponding infrared remote control code to the transmission device **11**. In step S**107** the first microprocessor **110** of the transmission device **11** converts the corresponding infrared remote control code into the wireless control signal. In step S**105** the second microprocessor **121** of the selected conversion device **12** converts the wireless control signal back to the corresponding infrared remote control code, and the infrared transmitter **123** transmits the corresponding infrared remote control code to the infrared receiver **21** of the corresponding home appliance **20** so as to provide remote control over the corresponding home appliance **20**.

With reference to FIG. **7**B, the smart electronic device has a learning mode for storage of the corresponding infrared remote control code. The learning mode is performed by the smart electronic device **10** and includes the following steps.

Step S**108**: Select the conversion device **12** corresponding to the corresponding home appliance **20**.

Step S**109**: Receive a corresponding infrared remote control code transmitted from the infrared remote control **22** of the corresponding home appliance **20** through the transmission device **11**.

Step S**110**: Store the corresponding infrared remote control code and the control command.

As to how to pick the configuration option **107** on the user interface **101** in search of one of the multiple conversion devices **12**, with reference to FIG. **8**A, the user interface displays the conversion devices currently identified and multiple device numbers corresponding to the identified conversion devices for users to select one of the multiple device numbers indicative of a corresponding conversion device to be selected. The status indicator **125** of the selected conversion device **12** emits flashing red light for users to confirm if the conversion device **12** with the status indicator **125** flashing red light is the conversion device **12** to be connected. In step S**108** If the conversion device flashing red light is the target to be connected, users can input the device number in association with the conversion device flashing red light via the user interface **101**. After the device number is inputted, in the event of successful connection, the status indicator **125** of the connected conversion device **12** flashes green light indicative of successful connection of the connected conversion device **12**. With reference to FIG. **8**B, users can configure model number, brand and mounting location of the home appliance **20** corresponding to the conversion device **12** to be connected. The configured model number, brand and mounting location of the home appliance **20** can determine a link distance between the conversion device **12** and to be connected for an infrared protocol applied to the conversion device **12** to be connected and a

corresponding home appliance **20**. After the configuration is done, users can press a learning mode button on the user interface **101**.

With reference to FIG. **8**C, the user interface **101** displays the multiple buttons simulating the multiple buttons of the infrared remote control **22** corresponding to the selected conversion device **12**. The simulated buttons are initially displayed in a dark color. The transmitter end of the infrared remote control **22** is directed to the infrared receiver **113** of the transmission device **11** for transmission of a corresponding infrared remote control code. Preferably, the infrared remote control **22** and the transmission device **11** are separated by 10 cm. With reference to FIGS. **8**D and **8**E, in step S**109** one of the multiple buttons on the user interface **101** is selected to confirm a control command intended for selection of the button, and one of the buttons shown on the infrared remote control **22** is pressed for the smart electronic device **10** to receive the infrared remote control code associated with the selected button on the infrared remote control **22** through the infrared receiver **113** of the transmission device **11**. Control commands for the buttons on the user interface **101** and on the infrared remote control **22** are identical.

In Step **110** the smart electronic device **10** stores the infrared remote control code and the corresponding control command. With further reference to FIG. **6**B, after the storage, color of the buttons on the user interface **101** changes from the dark color to a bright color, such as white or other color. Step S**108** to step S**110** are repeated to complete storage of the infrared remote control codes associated with all the buttons on each infrared remote control and the buttons displayed on the user interface **101**. After completion of the storage, the learning mode is finished and the buttons of the infrared remote controls **22** and the infrared remote control codes corresponding to the buttons are stored in the smart electronic device **10**.

The learning mode can be implemented in a different way. With reference to FIG. **8**B, after the model and brand of the multiple home appliances **20** are configured, a "DOWNLOAD" button on the user interface **101** can be pressed to download the infrared remote control codes of the infrared remote controls **22** of corresponding home appliances **20**. The smart electronic device **10** is connected to a cloud server through a network. The cloud server includes a database containing multiple infrared remote control codes corresponding to multiple home appliances with different model and brand. Given the configured model and brand of the multiple home appliances, the infrared remote control codes corresponding to the multiple home appliances can be downloaded from the cloud server and the control commands corresponding to the infrared remote control codes are stored in the smart electronic device **10** to simplify the storage of the infrared remote control codes and the control commands and the simplicity increases operational convenience.

After the learning mode is done, upon selection of each conversion device **12**, the user interface **101** displays multiple buttons corresponding to the buttons on the infrared remote control **22** of a corresponding home appliance **20** as shown in FIG. **6**B.

The learning mode can be repeated for the smart electronic device **10** to respectively connect to the multiple conversion devices **12** and store the infrared remote control codes associated with the infrared remote controls **22** of the multiple home appliances **20**. The multiple conversion devices are respectively fixed on the multiple home appliances **20**, such that the smart electronic device **10** can be collaborated with the transmission device **11** at act as an integrated remote control for the multiple home appliances **20**.

With further reference to FIG. **6**A, after the configuration of the multiple home appliances **20** is done, the multiple home appliances **20** are categorized according to types of the multiple home appliances **20** and the infrared remote control codes for controlling the respective types of home appliances **20** are stored under the image option **103**, the music option **105**, the air-conditioning option **106** and the other option **108**, such that the image option **103**, the music option **105**, the air-conditioning option **106** and the other option **108** on the user interface **101** can be selected to choose one home appliance to be controlled at a time. Besides, the user option **102** on the user interface **101** can be used to switch to a different user for different users to customize their preferred configuration.

The situational option on the user interface **101** is selected for the smart electronic device **10** in collaboration with the transmission device **11** to transmit multiple wireless control signals to corresponding conversion devices **12** and for the corresponding conversion devices **12** to transmit the infrared remote control codes to corresponding home appliances **20**. For example, selection of a movie situation can simultaneously power on a CD (Compact Disc) player and a television and switch video output from the television to the CD player.

In sum, the present invention allows the smart electronic device collaborated with the transmission device to perform the application program and act as an integrated remote control substantially replacing the infrared remote controls of the multiple home appliances to simplify remote control equipment of home appliances and provide accurate and fast remote control over home appliances. Additionally, radio communication is adopted between the transmission device and the multiple conversion devices. As radio communication is omnidirectional and can penetrate obstruction, the issues of unsmooth control due to obstruction or long distance between home appliances and their respective infrared remote controls can be avoided accordingly.

Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only. Changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A system for integrating infrared remote controls of home appliances, comprising:

a smart electronic device having an operating system to perform an application program, wherein the application program displays an user interface and stores multiple infrared remote control codes for respectively controlling multiple home appliances, wherein each infrared remote control code corresponds to a control command inputted from the user interface and the smart electronic device outputs a corresponding infrared remote control code;

a transmission device connected to the smart electronic device and having:

an infrared receiver connected to the first microprocessor and receiving the corresponding infrared remote control code;

a first microprocessor serving to convert the corresponding infrared remote control code into a wireless control signal; and

a first wireless transmission module connected to the first microprocessor and transmitting the wireless control signal; and

multiple conversion devices mounted on the respective home appliances, each conversion device having:

a second wireless transmission module wirelessly connected to the first wireless transmission module and receiving the wireless control signal;

a second microprocessor connected to the second wireless transmission module and converting the wireless control signal into the corresponding infrared remote control code; and

an infrared transmitter connected to the second microprocessor and transmitting the corresponding infrared remote control code to a corresponding home appliance.

2. The system as claimed in claim **1**, wherein multiple options corresponding to the respective conversion devices are displayed on the user interface, one of the multiple options is selected for a corresponding conversion device to control a corresponding home appliance.

3. The system as claimed in claim **1**, wherein each home appliance is equipped with an infrared remote control having multiple buttons, the infrared receiver of the transmission device serves to receive the infrared remote control code generated when each button of the infrared remote control is selected and transmit the infrared remote control code to the smart electronic device.

4. The system as claimed in claim **1**, wherein the smart electronic device has a connection port, and the transmission device has a connection plug plugged in the connection port for the transmission device and the smart electronic device to be electrically connected.

5. The system as claimed in claim **1**, wherein the wireless control signal is a radio signal, and the first wireless transmission module and the second wireless transmission module communicate with each other according to one of a ZigBee® protocol, a Bluetooth® protocol and a WiFi® (Wireless Fidelity) protocol.

6. The system as claimed in claim **1**, wherein each conversion device has:

a battery connected to the second microprocessor, the second wireless transmission module, and the infrared transmitter; and

a power management module connected to the battery.

7. The system as claimed in claim **2**, wherein each conversion device has a device number displayed on the user interface for selection of the conversion device.

8. The system as claimed in claim **2**, wherein the smart electronic device transmits the multiple wireless control signals to the respective conversion devices through the transmission device for the respective conversion devices to transmit corresponding infrared remote control codes to corresponding home appliances.

9. The system as claimed in claim **2**, wherein the smart electronic device has a connection port, and the transmission device has a connection plug plugged in the connection port for the transmission device and the smart electronic device to be electrically connected.

10. The system as claimed in claim **2**, wherein the wireless control signal is a radio signal, and the first wireless transmission module and the second wireless transmission module communicate with each other according to one of a ZigBee® protocol, a Bluetooth® protocol and a WiFi® protocol.

11. The system as claimed in claim **2**, wherein each conversion device has:

a battery connected to the second microprocessor, the second wireless transmission module, and the infrared transmitter; and

a power management module connected to the battery.

12. The system as claimed in claim **3**, wherein the smart electronic device has a connection port, and the transmission device has a connection plug plugged in the connection port for the transmission device and the smart electronic device to be electrically connected.

13. The system as claimed in claim **3**, wherein the wireless control signal is a radio signal, and the first wireless transmission module and the second wireless transmission module communicate with each other according to one of a ZigBee® protocol, a Bluetooth® protocol and a WiFi® protocol.

14. The system as claimed in claim **3**, wherein each conversion device has:

a battery connected to the second microprocessor, the second wireless transmission module, and the infrared transmitter; and

a power management module connected to the battery.

15. The system as claimed in claim **7**, wherein the smart electronic device has a connection port, and the transmission device has a connection plug plugged in the connection port for the transmission device and the smart electronic device to be electrically connected.

16. The system as claimed in claim **7**, wherein the wireless control signal is a radio signal, and the first wireless transmission module and the second wireless transmission module communicate with each other according to one of a ZigBee® protocol, a Bluetooth® protocol and a WiFi® protocol.

17. The system as claimed in claim **7**, wherein each conversion device has:

a battery connected to the second microprocessor, the second wireless transmission module, and the infrared transmitter; and

a power management module connected to the battery.

18. The system as claimed in claim **8**, wherein the smart electronic device has a connection port, and the transmission device has a connection plug plugged in the connection port for the transmission device and the smart electronic device to be electrically connected.

19. The system as claimed in claim **8**, wherein the wireless control signal is a radio signal, and the first wireless transmission module and the second wireless transmission module communicate with each other according to one of a ZigBee® protocol, a Bluetooth® protocol and a WiFi® protocol.

20. The system as claimed in claim **8**, wherein each conversion device has:

a battery connected to the second microprocessor, the second wireless transmission module, and the infrared transmitter; and

a power management module connected to the battery.

21. A method for integrating infrared remote controls of home appliances performed by a system for integrating infrared remote controls of home appliances, wherein the system has a smart electronic device, a transmission device and multiple conversion devices, the method comprising steps of:

connecting the transmission device with the smart electronic device for the smart electronic device to perform an application program, wherein the application program is launched to provide a user interface;

selecting one of the multiple conversion devices to be connected through the user interface, wherein the selected conversion device transmits an infrared remote control code to a corresponding home appliance;

establishing connection between the smart electronic device and the conversion device;

transmitting a wireless control signal to the selected conversion device through the smart electronic device in collaboration with the transmission device; and

converting the wireless control signal into the infrared remote control code and transmitting the infrared remote control code to the corresponding home appliance for control over the corresponding home appliance.

22. The method as claimed in claim **21**, wherein the step of transmitting a wireless control signal to the selected conversion device through the smart electronic device in collaboration with the transmission device has steps of:

receiving a control command and outputting a corresponding infrared remote control code to the transmission device through the smart electronic device; and

converting the corresponding infrared remote control code into the wireless control signal through the transmission device.

23. The method as claimed in claim **21**, wherein the wireless control signal is a radio signal.

24. The method as claimed in claim **22**, wherein the smart electronic device has a learning mode for storage of the corresponding infrared remote control code, and the learning mode is performed by the smart electronic device and has steps of"

selecting the conversion device corresponding to the selected home appliance;

receive the corresponding infrared remote control code transmitted from the infrared remote control of the corresponding home appliance through the transmission device; and

storing the corresponding infrared remote control code and the control command.

25. The method as claimed in claim **22**, wherein the wireless control signal is a radio signal.

26. The method as claimed in claim **24**, wherein the wireless control signal is a radio signal.

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